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ABSTRACT

This paper applies an evaluation method for World Wide Web sites that provide access to online reference materials at academic and public libraries. The evaluation of Web sites was performed with a questionnaire form focusing on Web site currency, accuracy and relevancy; Web site organization/structure; Web site presentation; URL maintenance; and Web site features. Average scores were tabulated from each of the five evaluation categories and Web sites were compared based on those scores. Six sites were chosen after scanning numerous Web sites at Berkeley Digital Library SunSITE's "Libraries On The Web." It was not proven whether reference sites that have been updated more recently have fewer cases of no URL found than those that have been updated less recently. Second, it would seem the university library reference sites utilize graphics better than the public library reference sites. Also there was very little difference in the quality of sites, although academic sites generally provided more than enough links and public library sites provided too little links. Most of the reference sites evaluated consisted of excessively large pages of links. It appears libraries are constructing reference sites with a linear model or some kind of variation of it. It gives the impression that they could do just as well with a Web search engine, without the library's assistance. (Contains 29 references.) (AEF)

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EVALUATION AND CRITERIA OF THE WORLD WIDE WEB: REFERENCE WEB SITES

A Master's Research Paper submitted to the
Kent State University School of Library Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

Floyd J. Csir

July, 1996

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Master's Research Paper by

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B.A., Penn State University, 1991

M.L.S., Kent State University, 1996

Approved by

Adviser_____Date_____

There are a number of technological challenges and opportunities awaiting librarians, whether they are cognizant of them or not. Questions abound about the role librarians will play within the scope of the Internet and the World Wide Web, questions which will unfold as the electronic age evolves.

The problem

This research paper applies an evaluation method for World Wide Web sites that provide access to online reference materials at academic and public libraries. Scrutinizing reference sites with a set of criteria may further the development of better library Web sites. It is hoped that librarians will come to understand the need for an evaluative process of the World Wide Web and other multimedia in order to maintain relevancy for current patrons and promote usage for potential patrons.

The objectives

To identify criteria or standards for the evaluation of Web pages in a library reference departments.

To compose a set of criteria for the scrutiny of Web pages in library reference departments as well as Web pages created by commercial efforts.

To compare and contrast the Web pages analyzed based on a set of criteria.

To consider the possible connection between Web page quality and library size and type.

Assumptions and Limitations

This paper assumes that libraries of all shapes and sizes are actively pursuing a presence on the World Wide Web, and specifically reference departments. It assumes some reference librarians are evaluating Web sites as part of their job descriptions.

Most of the sources cited in the literature review were published in print, although the nature of the Internet enables easy electronic publishing. However, since electronic journals have not been placed under the same quality rigors as print publications, such as peer and/or editorial review, print publications have been cited more often in this paper. Ideally, most of the sources for such a paper about the Web should come from the Internet and not from print sources.

This paper does not assume to be an exhaustive analysis of all reference department Web sites. More importantly, it should be noted the evaluation of Web pages is very much a subjective process and is not intended to defame or discredit any institution. As long as people are involved with the criticism of Web pages, this process will be imperfect and open to debate.

Methodology

The evaluation of Web sites was performed using a model developed from sources mentioned in the literature review. The model is in a questionnaire form, which follows:

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible.
2. When was the last time the site was updated?
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links.

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0.
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading.
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest.

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend.
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use.
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate.

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0.
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0.
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0.

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0.?
2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes

answers receiving a 10 and no answers receiving a 0.

3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0.
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0.
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0.

Average scores were tabulated from each of the five evaluation categories. Those averages were added together. Then, the Web sites were compared and contrasted based on those scores. The reviewer's subjective and objective comments about the Web sites were used to discuss the evaluations based in part on a loose set of criteria mentioned in the literature review.

The six sites were chosen after scanning numerous web sites at Berkeley Digital Library SunSITE's "Libraries On The Web" in the USA (http://sunsite.Berkeley.EDU/Libw\eb/usa.html). The Berkeley site lists both public and academic libraries, regardless of whether they contain an online reference site or not. The sites were chosen after meeting two criteria which can be determined from the 1995 edition of the American Library Directory, which include:

1.) Is the library automated?

2.) Does the library contain at least 100,000 book titles?

Also, library reference web sites were chosen if they: (1.) provided links to web sites which can be used to answer reference questions for both librarians and/or patrons; (2.) were developed uniquely by the specific library and not merely a link to another library's reference web site; (3.) the library included some indication of responsibility or accountability for the web site with a email address of a librarian's

name, web design team name or library name; (4.) the web site indicated when it was last updated.

Sixty web sites were viewed from the "Libraries On The Web" list, with half being public libraries and the other half academic libraries. It should be noted that roughly 75 percent of the sites had lists of links to answer reference questions, although some of these sites were called Internet resources, subject links or favorite web sites. Except for the New Orleans Public Library, all of the sites evaluated here use the term "reference" or "ready reference" to describe their web resource links. Three reference web sites from university libraries and three reference web sites from public libraries were selected from the "Libraries On The Web" Web page that met the above-mentioned criteria.

Hypothesis

The evaluations were expected to demonstrate a difference between those sites which have been updated more recently than those that have not. Also, it was anticipated that academic libraries would make better use of graphics than public libraries but little difference would be found in the quality of the links to Internet reference resources.

Definitions *

Browser
A client program (software) that is used to looking at various kinds of Internet resources.

Cyberspace
Term originated by author William Gibson in his novel "Neuromancer", the word Cyberspace is currently used to describe the whole range of information resources available through computer networks.

E-mail
(Electronic Mail) -- Messages, usually text, sent from one person to another via computer. E-mail can also be sent automatically to a large number of addresses (Mailing List).

HTML
(Hypertext Markup Language) -- The coding language used to create Hypertext documents for use on the World Wide Web. HTML looks a lot like old-fashioned typesetting code, where you surround a block of text with codes that indicate how it should appear. additionally, in HTML you can specify that a block of text, or a word, is "linked " to another file on the Internet. HTML files are meant to be viewed using a World Wide Web Client Program, such as Mosaic.

HTTP
(Hypertext Transport Protocol) -- The protocol for moving hypertext files across the Internet. Requires a HTTP client program on one end, and an HTTP server program on the other end. HTTP is the most important protocol used in the World Wide Web (WWW).

Hypertext
Generally, any text that contains "links" to other documents -words or phrases in the document that can be chosen by a reader and which cause another document to be retrieved and displayed.

Internet
(Upper case I) The vast collection of inter-connected networks that all use the TCP/IP protocols and that evolved from the ARPANET of the late 60's and early 70's. The Internet now (July 1995) connects roughly 60,000 independent networks into a vast global internet.

internet
(Lower case i) Any time you connect 2 or more networks together, you have an

* Definitions from Matisse Enzer and *Internet Literacy Consultants*.

internet - as in inter-national or inter-state.

Listserv

The most common kind of maillist. Listservs originated on BITNET but they are now common on the Internet.

Netscape

A WWW Browser and the name of a company. The Netscape (tm) browser was originally based on the Mosaic program developed at the National Center for Supercomputing Applications (NCSA). Netscape has grown in features rapidly and is widely recognized as the best and most popular web browser. Netscape corporation also produces web server software. Netscape provided major improvements in speed and interface over other browsers, and has also engendered debate by creating new elements for the HTML language used by Web pages -- but the Netscape "extensions" to HTML are not universally supported. The main author of Netscape, Mark Andreessen, was hired away from the NCSA by Jim Clark, and they founded a company called Mosaic Communications and soon changed the name to Netscape Communications Corporation.

URL

(Uniform Resource Locator) -- The standard way to give the address of any resource on the Internet that is part of the World Wide Web (WWW). A URL looks like this:

http://www.matisse.net/seminars.html
or telnet://well.sf.ca.us
or news:new.newusers.questions

The most common way to use a URL is to enter into a WWW browser program, such as Netscape, or Lynx.

Usenet

A world-wide system of discussion groups, with comments passed among hundreds of thousands of machines. Not all Usenet machines are on the Internet, maybe half. Usenet is completely decentralized, with over 10,000 discussion areas, called newsgroups.

WWW or Web

(World Wide Web) -- Two meanings - First, loosely used: the whole constellation of resources that can be accessed using Gopher, FTP, HTTP, telnet, Usenet, WAIS and some other tools. Second, the universe of hypertext servers (HTTP servers) which are the servers that allow text, graphics, sound files, etc. to be mixed together.

II. Literature Review

Librarians' Roles in the Future

When a librarian asks about his or her place in the emerging world of online media, such as the World Wide Web, he or she probably wonders where to begin. There are so many separate and distinct parts to know about the Internet. This literature review reflects the changing roles of librarians and information scientists; the composition of the virtual library and how librarians will perform within that environment; and a sporadic number of articles which consider users needs in the virtual library. There is scant literature about web standards and criteria, although this is exactly what is needed if librarians are to understand and better serve patrons via electronic resources. No discussion has been found in this literature review questioning whether libraries should participate with technologies such as the World Wide Web -- the question now is how can librarians serve patrons as effectively in cyberspace as they do in the real world.

Just how often do reference librarians utilize the Internet? This question was the basis of a survey by Geetali Basu in 1994, who found that "many librarians were not using [sic] Internet to answer reference questions" (Basu 38).

Librarians must decide what role they will play within the new technology of the World Wide Web, as well as future environments. Numerous articles discuss the potential roles of librarians. One basic issue is whether to mediate on the behalf of patrons or not. "Should librarians offer 'reference services' which are aimed at taming the wild frontier that is currently the Internet? Or perhaps for some the question is, *can* librarians *offer* such services?" (Summerhill 142). This question goes back to the root differences between conservative and liberal librarianship -- serve many patrons at a

basic level while educating them or serve fewer patrons with advanced service at the expense of others. There may be some patrons reluctant or unwilling to venture into the Internet; yet library staff time and money, already strained in this fiscally conservative time in some cases, may be funneled in that direction.

Consultant is another role for librarians to consider in the Information Age. One viewpoints believes librarians must assist users to navigate through the glut of data and information available on the Internet (Myers 637). Another view is that librarians must not be "intermediaries," since "[e]lectronic libraries are being built along similar self-service lines. They are designed for use with librarians serving not as intermediaries but as consultants" (Barnes 58). Again, this discussion boils down to the conservative versus liberal debate in librarianship.

New technology requires librarians to acquire a new set of skills. One study at Cornell University's Mann Library discovered the library was serving roughly the same number of patrons as they had ten years previously, but had a 50 percent increase in reference questions over the same time (Barnes 49). "More databases for users seem to bring more questions from users -- questions about database content, database selection, and system use ..." (Barnes 49) Technological advancements have made more information available more frequently. Users hope they can find assistance from anyone willing to provide information in the format they need without being "... buried in piles of information" (McClure 54).

Collecting, organizing and cataloging data from the Internet and other electronic media, such as CD-ROM technology, will increase greatly:

> Everybody will need skills to retrieve and manage information to get along. Many will probably find the large quantity of information overwhelming, and will seek education or assistance in improving their information retrieval and management skills (Desmarais 164).

Until recently, when World Wide Web search engines became plentiful, the Internet

was a means to make lots of data available world-wide with the assumption the someone would arrange it (McClure 54).

Librarians will be asked to serve as cyber-lifeguards on the virtual shoreline of the Internet, helping users or "surfers" stay afloat. in other words, librarians will aid users make sense of what they have found or provide better search techniques. States Charles Lowry: "It is still perilously easy for ordinary users to become lost on the Internet, leading to frustration and decreasing the likelihood that they will discover something useful" (49). Evaluating Web sites and other Internet tools will become a part of this new reference service patrons will expect and is another avenue for librarians to pursue in order not to become defunct, just as bank tellers are today since the invention and acceptance of ATM machines. "Internet sources ... should be subject to the same rigorous attention given paper and CD-ROM sources: the content, usability, and cost should be evaluated and compared with other sources" (Falcigno 24). Not only should librarians be trained on how to operate within the Internet and electronic environments, but they must be educated on how to best utilize them (Bruce 39). It would be simple to provide links to various Web sites without regard to their content; thus providing access, but what about content?

> Librarians will have to evaluate web resources to assure the quality of the information provided. It is fair to say that this will be one of the big problems with web resources, and one for which there are no easy answers" (Healey 444).

One controversial task some librarians envision is that of a communal network for reference questions. Obviously, this view is supported by the conservative / minimalist camp, who dislike answering basic questions repeatedly (Myers 636). They see a chance to provide basic information in FAQ format (frequently asked questions), a term for answers to questions frequently asked by new Internet users.

Myers and Humphreys hope librarians around the world begin to collaborate

their knowledge just like catalogers who incorporate Library of Congress' MARC records (machine-readable records) into their online public access catalog (OPAC). (636) (460). Automating the reference desk would involve cataloging reference questions and answers as hyperlinks to the reference collection via the OPAC and making it available to other reference librarians (Humphreys 460-2). Although this is a radical idea, part of this notion already exists. The Internet listserv called "STUMPERS-L" provides librarians, patrons, students and researchers from around the world the ability to ask difficult reference questions in the hope someone will know the answer (STUMPERS).

Lowry foresees a "new library paradigm" that will occur because of the integration of the Internet into the library "technology environment" as well as the expert assistance from librarians, who will "guide library patrons toward resources that are useful" (48). There are ample opportunities for librarians to continue serving their patrons, but librarians must decide just how much time, money and effort they will expend for users in the virtual library.

Users' needs

> In the telecommuting age, we still have the need to know people as people, not just as words on a flickering screen (Reid 221).

Users should be the prime concern for librarians. Obviously, librarians would not have careers without users visiting the library, either physically or electronically. Librarians who are responsible for designing and maintaining web sites should consider making the web site as easy to use as possible and available to the lowest common denominator in the technological sense.

Aside from the above mentioned layout considerations, there is a need for librarians to understand and appreciate users' experiences with the library. Although many librarians can pursue a reference question doggedly, delving into various sources to come up with the right answer if they choose, it would seem users are not as patient. "What is a user's information tolerance?" LaGuardia states, adding:

> Just how much information overload can you stand? What is your technostress tolerance? .... How do you feel about wading through four hours of online dreck [sic] before finding a kernel of research truth? (43).

As technology advances, librarians who *decide* to not keep pace with the rest of society may find themselves irrelevant to their more educated patrons. One example of increasing patron demands, based on technology, is the delivery of information. Before online commercial vendors were able to provide full-text magazine articles, library patrons had to wait at least several weeks in order to receive materials through their library's interlibrary loan department if a library did not subscribe to a particular journal. Now, with full-text resources instantaneously available, users will deem any service slower than that benchmark as unacceptable (Summerhill 139). Whether this expectation is justified or not is irrelevant, since its the users who determine whether

libraries are worth their time.

Since users' needs and demands are changing, librarians will be forced to adapt their delivery and access to information. Originally, librarians were just concerned about automating their libraries' basic functions and card catalog. But now that librarians really are not performing mediated online searches as they did twenty years ago, the ease of use for users' has become a prime focal point for access (Lowry 50).

> Now, the vision is of client software running on the users desktop computer and retrieving bibliographic, full-text, and (eventually) multimedia information stored on servers located at various sites. The user interface of the virtual library client must enable users to easily navigate an increasingly complex information environment and manipulate the information retrieved. ... To understand how we will provide access in the future, we must think in terms of the common user interface, not the OPAC. To crib a slogan, "It's the GUI, stupid!" (Lowry 50).

Either librarians consider how they will deliver information within the framework of the technological future and an eye focused on users' expectations and needs, or they will become irrelevant to users.

Virtual, Digital and Electronic libraries

Discussion of librarians' future role in the Information Age can not be accurately depicted without an examination of the virtual library. Specifically, how will reference librarians operate within this new library setting? Many articles in the literature review apparently apply the terms virtual, electronic and digital synonymously, except for Reid's article, which will be discussed later.

A paradigm shift is occurring as librarians consider their place in the virtual library, determined in part by librarians' openness to new methods of service:

> Our response to this change (and the opportunities it presents) ought to be a willingness to experiment vigorously with new services and technologies, resulting in the selection of those that hold the greatest promise of providing information resources for the future. ... We must formulate a vision that will result in a foundation for the virtual library that will work at least as well as the old paradigm worked in its time (Lowry 39).

It seems inevitable that reference librarians will be answering questions via email, which will leave libraries open to worldwide service (McClure 54). In order to deal with great demand for email reference service, librarians may set up an automated FAQ center or "hypertext search guide" (Myers 636). Users within the Mann Library at Cornell University can request a librarian to assist them by sending an electronic message from their terminal (Barnes 49). There will be new ways for users to interact with librarians, but not necessarily better ways.

As an "electronic scholarly communications system," the WWW offers many advantages to users, including " 'ease of use, standardized language, extremely inexpensive, hypertext format [to] enable browsing and serendipity, customizable, always available, expandable and is accepted' " (Gorka 21). Other advantages to libraries include their ability to operate with various aspects of the Internet, including

gophers, WAIS, ftp and telnet sites; web servers can easily establish a library's presence on the Web; an abundance of information on any topic; and integrating various sites into one central location enables precise or expanded access to Web sites (Healey 442).

Librarians will be challenged by users and other librarians to make sense of this overabundance of information. To that end, librarians have begun to catalog Internet sites in the hope of integrating virtual resources within the OPAC. One study attempted to apply MARC cataloging rules to FTP sites (Dillon 88, 90-1). Client-server technology is moving the library into cyberspace. "Client-server architecture is the key concept underlying mass distribution via multiple channels. Servers make all kinds of information available to computers wired to a network. Clients provide an interface to the information offered up from servers" (Alberico 31).

Balance between Print and Electronic media

Since the nature of information will increasingly involve electronic multimedia and full-text, libraries should be prepared to provide access to these electronic media, just as libraries have provided access to books. It will require a commitment on the part of "digital research libraries" to accept electronic information in this fashion (Graham 332). These select few digital research libraries will become regional warehouses for electronic information and must be "committed to organizing, storing and providing electronic information for periods of time longer than human lives." (332).

Collection development policies would be needed in order to determine which information is most useful for storage, considering costs will also prevent these digital research libraries from collecting all electronic data (Graham 333).

In the practical sense, collection development policies will be necessary in order to avoid overwhelming users visiting a library's WWW site. This could cause "technostress" to patrons. "[A]dding too many links leaves the user feeling as if they could do better on their own" (Falcigno 26). The nature of the Web requires librarians to change their view of the collection development process as passive. "... [E]lectronic information is dynamic. To use it, one must interact with the store of information, spread across a loose network and constantly changing" (Alberico 31).

Initially, if a library was to decide to archive electronic media, it must believe that electronic media is as important as print sources (Graham 337). This acknowledgement does not mean libraries will treat information in either format as having the same properties because, in fact, they do not.

Print media has a remarkable resiliency and simplicity that electronic reference resources can only imagine. "The book is a marvelous technology for telling extended stories and making overarching statements. Books will be around for a long time"

(Myers 638). Although the Internet provides access to numerous amounts of data, scattered worldwide, it currently can not approach the convenience and authority of print sources in answering reference questions. "Simple data retrieval ... can be retrieved at present more efficiently and quickly by reaching for a standard printed reference tool" than Web site (Santa Vicca 233).

The key to the debate between print and electronic sources is to utilize the best aspects of each format so librarians can provide good reference service to patrons (LaGuardia 43).

Technological Difficulties

Technological advancement does not come without a price, and not just a monetary price. Hardware and software must compliment each other correctly in order to access information found in electronic format, thus resulting in a "co-dependent" relationship between librarians and users -- and technology (Cady 207). "With the cancellation of paper copies in favor of CD-ROM products, the malfunctioning of any of the complicated parts and pieces of our CD-ROM network ... means that virtual library patrons are locked out of liberspace as completely as if we closed the physical buildings at random during the day" (207).

More specifically, data and information found on the Internet lack some of the qualities librarians and patrons take for granted. Some of these limitations include " 'a lack of consistent classification scheme or graphical cues to aid users; authority control is absent or difficult to determine; data and information are rarely evaluated for content; software does not filter the data by subject or content; and keyword-Boolean operators are inadequate for locating full-text resources' " (Lowry 48). For reference librarians, the lack of indexing on the Internet really inhibits its usefulness as a reference tool (Summerhill 137). Other problems include the volatility of Web sites and email addresses, which means important information or service may suddenly move without notice. Also, Internet traffic can become clogged at various times of the day (Bruce 40). "Likewise evaluating resources becomes a problem if the resource cannot be located" (Bruce 40).

Other problems for librarians attempting to use the Internet as a reference tool include "the ability to connect ... the searcher's level of expertise ... the ability to quickly retrace your steps" among other problems mentioned above (Basu 39). Simply conducting a reference interview through the telephone is difficult enough -- imagine

attempting to understand someone's query sent via email. "How can you relate to someone you do not see?" (Reid 217). Also, the long search time required for Internet reference questions and the investment in librarian training will continue to hold back the day-to-day implementation of the Internet into reference work (Augustine 22).

Web Standards, Criteria & Design

There are a few important facets to information provided through the WWW, qualities that users currently expect and demand as well as librarians who must initially "surf" the Internet to find information for their patrons. There are only a few sources of criteria that have been published in scholarly journals or exist on the Web and there is a definite need for more research and study in this area. Based on the standards collected, researchers tend to group criteria as lists with brief annotation. Although the criteria are generally similar, it is the combination of criteria that sets one standard from another.

Convenience should be a prime consideration for web designers, which can be obtained by selecting sites that have full-text documents rather than just bibliographic citations. "The more the resource provides the actual information needed ... the more students like it" (Cady 208-9).

Quality is another consideration, closely associated with convenience.

> Quality as a goal for Web information involves a continuous process of planning, analysis, design, implementation, and development to ensure that the information meets users needs in terms of both content and interface (December 1119).

Criteria for web quality revolves around information through verifying that information is: " 'correct,' 'accessible', 'usable', 'understandable', and 'meaningful' " (December 1119-20). Similar web page standards have been adapted from the efforts of Jakob Neilsen which include: " 'reliability, distinctiveness, easy to use/remember, accuracy, modularity [an interdependent unit structure of the Web site which enables adding pages easily], optimization [a Web site designed for a variety of formats and browsers], and a [mechanism for] user feedback' " (McCleod 48). Another set of criteria involve "purpose, authority, scope, audience, cost, format, special features and

the existence of reviews which might speak to any or all of the criteria above" (Katz 23-29).

Obviously, any set of criteria combinations is possible and is as subjective an assessment as the actual evaluation or review of a web site. Another list of criteria includes the following criteria:

> ease of finding out the scope and criteria for inclusion that lets the evaluator see if it matches a library's needs
> ease of identifying: the authority of authors, the currency, the last update, and what was updated.
> stability of information
> ease of use:convenience or organization and speed of connection (Tillman)

In a related issue, there is also a need for Internet site selection standards, similar to a collection development policy for a library's Web pages. One such article discusses several possible factors for Internet site selection, including the " 'quality and content of the source, relevancy, ease of use, reliability and stability, cost and copyright issues, and hardware and software compatibility' " (Pratt 134-5).

A collection of roughly 100 university Web publishing guidelines is a useful tool for libraries looking to devise their own polices. (Kimmel)

Yale University's manual describes the design principles used to create the pages within the Center for Advanced Instructional Media's (C/AIM) World Wide Web site. The manual's section on World Wide Web site structure states:

> The user's perception of and assumptions about the organization of your World Wide Web (WWW) site can have a major impact on the usability of your page and site design. The power of WWW lies in the myriad of links that are possible with hypertext linkage of documents and Web sites. ... Good graphic design always seeks the optimal balance between visual sensation and graphic and text information (Lynch).

Evaluation Form for Mansfield University

http://www.mnsfld.edu/depts/lib/index.html

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible. **10**
2. When was the last time the site was updated? **May 21, 1996**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links. **9**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading. **10**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest. **10**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend. **7**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use. **4**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate. **5**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0. **10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0. **0**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0. **10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0.**0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0.**10**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0.**10**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0.**0**

Total Score = **37.4**

Evaluation Form for Morton Grove Public Library

http://www.nslsilus.org/mgkhome/orrs/orrsmenu.html#top

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible. **10**
2. When was the last time the site was updated? **May 13, 1996**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links. **9**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading. **8**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest. **10**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend. **8**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use. **8**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate. **9**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0. **10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0. **10**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0. **10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0. **0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0. **0**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0. **10**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0. **0**

Total Score = **41.1**

Evaluation Form for New Orleans Public Library

http://www.gnofn.org/~nopl/

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible. **8**
2. When was the last time the site was updated? **May 15, 1996**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links. **8**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading. **9**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest. **9**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend. **5**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use. **2**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate. **10**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0. **10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0. **0**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0. **10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0. **0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0. **0**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0. **10**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0. **0**

Total Score = **33.5**

Evaluation Form for Purdue University

http://thorplus.lib.purdue.edu/reference/index.html#periodic

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible.**8**
2. When was the last time the site was updated? **December 18, 1995**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links. **8**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0.**10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading.**8**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest.**10**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend.**6**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use.**8**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate.**8**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0.**0**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0.**10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0.**0**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0.**10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0.**0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0.**10**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0.**10**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0.**10**

Total Score = **35.9**

Evaluation Form for Appleton Public Library

http://www.apl.org/pages/InfoSources.html

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible.**8**
2. When was the last time the site was updated? **May 23, 1996**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links.**8**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0.**10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading.**10**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest.**10**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend.**10**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use.**1**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate.**6**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0.**0**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0.**10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0. **10**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0.**10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0. **0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0. **0**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0. **10**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0. **0**

Total Score = **34.2**

Evaluation Form for University of California at Santa Barbara

http://www.library.ucsb.edu/subj/resource.html

I. Web site currency, accuracy and relevancy

1. Did the hypertext links retrieve the site or was the URL not found; on a scale of 0 to 10, with 0 being all links inaccessible, and 10 being all links accessible. **8**
2. When was the last time the site was updated? **April 23, 1996**
3. Are the hypertext links appropriate and relevant for an online reference desk or are the sites of questionable value; on a scale of 0 to 10, with 0 being the least relevant and appropriate links and 10 being the most relevant and appropriate links. **5**

II. Web site organization / structure

1. Is the site accessible from Netscape 2.0 browsers; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Do all images, icons and graphics paint when the Web page loads; on a scale of 0 to 10, with 0 being none of the images, icons and graphics loading and 10 being all of the images, icons and graphics loading. **6**
3. How fast does the Web page paint; on a scale of 0 to 10, with 0 being the slowest and 10 being the quickest. **10**

III. Web site presentation:

1. Are any graphics and text blurry, difficult to read or comprehend; on a scale of 0 to 10, with 0 being the most unreadable, difficult to read or comprehend and 10 being the most clear, easy to read and comprehend. **9**
2. Are there too many or too few graphics; on a scale of 0 to 10, with 0 being too many or too few graphics and 10 being the most appropriate middle ground for graphics use. **7**
3. Are the Web pages easy to navigate; on a scale of 0 to 10, with 0 being the most difficult to navigate and 10 being the easiest to navigate. **8**

IV. URL maintenance

1. Are the names of the people or persons responsible for the site displayed; with yes answers receiving a 10 and no answers receiving a 0. **10**
2. Is there a <mailto> HTML tag which allows a user to send feedback or comments to the library; with yes answers receiving a 10 and no answers receiving a 0. **10**
3. Is there a disclaimer about the validity or reliability (or lack thereof) of the information provided by the institution; with yes answers receiving a 10 and no answers receiving a 0. **0**

V. Web site features

1. Is there an option to search a library's OPAC or online databases; with yes answers receiving a 10 and no answers receiving a 0. **10**

2. Is there an option to request reference assistance (from a human being) such as via email, online chatting or virtual reality; with yes answers receiving a 10 and no answers receiving a 0. **0**
3. Are there hypertext links to other Web reference sites; with yes answers receiving a 10 and no answers receiving a 0. **10**
4. Are there hypertext links to the community or region; with yes answers receiving a 10 and no answers receiving a 0. **0**
5. Is there a search engine of the reference sites made available; with yes answers receiving a 10 and no answers receiving a 0. **10**

Total Score = **35.7**

Findings

Mansfield University's Web reference site splits its online reference sources into two sections, with a list of 16 reference subject headings (such as Business and Economics, News and Current Events) and a ready reference section. However, there is also a section from the library's menu screen for a third section called the "MU Virtual Subject Library" which closely resembles the reference page section mentioned above. It appears the MU Virtual Subject Library is being replaced by the reference page listing, but there is no obvious indication for this nor is there an explanation.

Navigation is also problematic because the terminology is inconsistent. For example, the Ready Reference sources are listed on the home page. At the Ready reference resources page, the bottom internal link points to the top of the page and an internal link to the Table of Contents. However, the Table of Contents is very near the top of the page; it appears the links are redundant.

The site is also graphically inconsistent. Most pages have the same white background, but some in the MU Virtual Subject Library have a brownish texture background. Plus, the menu bar (with internal links to main pages on the site) is not applied evenly throughout the site. On a positive note, there are descriptive abstracts and commentaries about the different web reference sites.

Morton Grove's site contains all of the library's policies, which can be useful not only for patrons, but for other librarians who must devise policies. A policy for selecting Web resources is an excellent idea (and a rarity). It helps to inform users about the decisions behind the selection process.

The names of staff members who contributed to the web site are also included.

Also, there is a "Site Map" which gives a visual layout of the web site. Although the site is not complex, this visual index of the site can help orient users to find areas that are pertinent or perhaps not otherwise noticeable.

The graphics are used when needed, and are large enough to read but do not drown out or overshadow the text. The reference subject list is based on the Dewey Decimal Classification Scheme, which has internal links to sites further along the large reference page. There is just enough sites to be useful and yet restrained so that users do not become overburdened by the sheer size of the virtual reference collection, seemingly a common occurrance. Although the reference page could be broken up into ten separate pages for each Dewey Classification subject heading, (it currently is divided into two sections) this site is easy to navigate and apparently includes the necessary links for online ready reference.

The New Orleans Public Library site appears to be still under construction. For example, the link to the "Information & Reference Division" points the user to nothing except a page with an "under construction" sign.

There are too few links for each subject heading to be of much help in answering a reference question. However, there is a good listing of local web pages that could help tourists or new residents discover the flavor of New Orleans.
The presentation of the home page, which also lists the reference subject headings, is weak and unappealing. Gray backgrounds and a cluttering of small font sizes do not make for an easy or pleasurable browsing experience.

One of the subject headings in the reference section is "Big Rat's selection of miscellaneous reference sites." This may be a local joke or based on myth, but for an outsider this does not enhance a professional image of the web site.
Most of the reference links annotations are too brief and not very useful.

Purdue University's reference annotations appear to be accurate descriptions of the links. Even the subdirectories have annotations which instructs users about the purpose of each section's purpose. The pages are very consistent visually, with a black background, white text and yellow links. Also, the search engine capability, located at the library's home page, is a convenient feature and should be considered a standard feature by all large library web sites.

Unfortunately, there are no subject links in the virtual reference desk. There is a page called the "Subject Reading Rooms" broken down by subcategories such as "Humanities, Social Sciences, Natural Sciences ...." and so on, but this area is still under construction. The virtual reference desk contains links that would be useful for ready reference applications -- with sites that include dictionaries, time and date, zip codes, maps and travel information and other reference sites.

Appleton Public Library's reference site is simply one long page, which does not make it easy to find the appropriate section easily, although subject heading links refer to internal parts of this large page.

All links on the home page are embedded in paragraphs, which forces the user to read. This is not convenient (i.e. requires too much time for users to browse) and makes it difficult to scan a page and the gray background is not very distinctive or appealing.

There are ample links to local and state information links which could be useful to tourists, taxpayers and new residents. For example, there is a pointer to the "Wisconsin Elected Officials Home Page". In addition, the reference page first lists roughly 10 Web search engines before providing its list of reference sites -- this does not promote access and once again, inconveniencing the user.

The University of California at Santa Barbara site lists its "Reference Services" site separate from it's "Information Resources by Subject." The "Reference Services" page was evaluated. Evaluating the "Information Resources by Subject" pages would have been too time consuming for this research paper since there appeared to be more than 100 subject specialties listed, each with a lengthy set of links. It would be convenient for the "Reference Services" page to include internal referral links to the "Information Resources by Subject" pages.

The menu screen at the top of the subject headings list is useful. After each subject heading listed in the "Reference Services" page, there is an option to return to the top of the page, which is a nice feature since the links are arranged on one long page. However, there are not enough links in the reference page. Plus the links are not adequately annotated, which could mean there was not much effort placed in evaluating the sites. For example, the sole entry under the "Arts" subject heading is a link to "The Seven Wonders of the Ancient World" - which could just as easily be placed in under the "History" subject heading.

Curiously, the "General Works" subject heading does not contain links to dictionaries, although there are several such Web sites that are available and free of charge.

Conclusion

It was not proven whether reference sites that have been updated more recently have fewer cases of no URL found than those that have been updated less recently. It's possible that this is merely a result of the random sampling of links. Another possible explanation is that the update information is not accurate, i.e., that librarians may forget to change the date after revising the page. Probably the best measurement for URL accessibility would involve checking a library's reference site with an HTML checker found on the Web. Not only would this be more scientific, it would not be influenced by random sampling error.

Second, it would seem the university library reference sites utilize graphics better than the public library reference sites. Also, there was very little difference in the quality of sites, although academic sites generally provided more than enough links and public library sites provided too little links.

Most of the reference sites evaluated consisted of excessively large pages of links. Although these sites contained internal links from broad subject headings to the actual reference links on the Web, this was still inadequate. It appears libraries are constructing reference sites with a linear model or some kind of variation of it. Users will not enjoy scrolling through large pages to find relevant links. It gives the impression that they could do just as well with a Web search engine, without the library's assistance. Morton Grove's site, which provides users with a graphical representation of the different pages available and summaries of those pages, should be adopted by other reference sites. Also, Purdue University's search engine feature enables users to access the site without getting lost in a maze of hierarchical page structure. Yet, users could still get lost sifting through the search engine's results. Not only are abstracts a time saving feature for web searchers because they determine if

the site would be helpful or not, but also indicates the webmaster or web team exerted effort into the deciding what resources are potentially best for users' information needs. Online reference and Web collection policies not only help users understand librarians' thought processes, but potentially adds to the collective information available to the library science field.

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